of the leaves as a result of an epidemic of rust. The protection afforded by the monocotyledonous "grass type" of leaf was in every case found to be far more efficient than that of the dicotyledonous type. This is illustrated by the results with alfalfa.

Samples of common alfalfa (*Medicago sativa* L.) were taken from a 5-year-old stand on alluvial soil on April 20. The tops were 5 inches high and completely concealed the soil. The clipped sample was entirely eroded in 11.5 minutes; that with tops intact in 32 minutes. The soil of another set of samples on May 16, when the plants were 16 inches tall and better developed, was completely washed away in 14 and 28 minutes, respectively. These last samples were secured after heavy rains which delayed cutting and resulted in the loss of most of the leaves to a height of 18 inches. Hence, samples on June 5 were entirely eroded in 11.5 and 30.5 minutes, respectively. The second growth, when 28 inches tall, prolonged the time of erosion to 43 minutes; with tops removed to 21 minutes. Thus well established stands of alfalfa protect the soil from erosion to a much smaller degree than does a crop of maturing wheat. Young alfalfa is much less efficient.

Root systems of native grasses are far more efficient than are those of most crops. By May 15, 1934, Kentucky bluegrass (*Poa pratensis* L.) was killed in most pastures in eastern Nebraska by the great drought. Samples with tops removed were eroded in Carrington silt loam soil in the spring of 1934 in 2 hours with the open hose plus 2 hours with a stream of water $\frac{3}{8}$ inch in diameter delivering 3.5 gallons of water per minute with a force of 1.4 pounds on .11 square inch of surface. By the next spring similar samples were eroded in 80 minutes with the open hose, and in late July, when the rhizomes and most of the roots were decayed, in only one fourth this time.

A thick, fully grown stand of wheat grass (*Agropyron Smithii* Rydb.) held the soil for 46 minutes when the tops were removed. A period of 3 hours and 31 minutes (with open hose) was required for similar results when the tops were left intact. Big bluestem (*Andropogon furcatus* Muhl.) is even more efficient. The period for erosion with tops removed was, in addition to two hours with the open hose, 2 hours and 40 minutes. A period of 13 hours was required when the maturing tops were intact. The soil beneath a fully grown, thick stand of slough grass (*Spartina Michauxiana* Hitchc.) can scarcely be eroded, although the underground parts are only moderately efficient. Roots and rhizomes alone held the soil against erosion for about 2 hours (open hose). Application of the water stream under the greater pressure during a period of 13 hours failed to remove any perceptible amount of soil when the cover was intact.

A complete report on the efficiency of important field and garden crops, weeds and native grasses is in preparation.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

RIO-HORTEGA'S DOUBLE SILVER IMPREGNATION TECHNIQUE ADAPTED TO THE STAINING OF TISSUE CULTURES[1, 2]

WE have had equivocal results in employing the various techniques described in the literature for silver staining of tissue cultures *in situ* in the plasma clot. As a result we strove to find a simple, dependable technique which could be carried out quickly. Such a one follows in detail:

(1) Fix for 24 hours in equal amounts of 10 per cent. neutral formalin and normal salt solution after removing all paraffin and vaseline from the cover slip.

(2) Wash in 30 cc of distilled water to which has been added 6 drops of ammonium hydroxide—5 minutes for thin clots on cover slips and up to 15 minutes for thicker clots in Carrel flasks. (Petri dishes used throughout. It is necessary that the water employed be doubly distilled.)

(3) Wash in distilled water.

(4) Place into the following mixture: 30 cc of 2 per cent. silver nitrate (reagent), 50 drops of 95 per cent. alcohol, 25 drops of pyridine, 5 drops of ammonium hydroxide. This is heated slowly up to 40° C. until the characteristic yellow color develops (about 12 minutes).

(5) Wash in distilled water.

(6) Place in the following mixture: 30 cc of silver carbonate, 25 drops of 95 per cent. alcohol, 15 drops of pyridine, and heat slowly up to 40° C. until the fragments take on a brown color (about 9 minutes). The silver carbonate is made by adding to 5 cc of a 10 per cent. silver nitrate (reagent) 20 cc of a 5 per cent. sodium carbonate. A white precipitate is formed which is dissolved by the addition of ammonium hydroxide drop by drop, being careful not to add an excess. It is then made up to 75 cc with distilled water.

(7) Wash in distilled water.

[1] From the Montreal Neurological Institute, McGill University.

[2] Read at the meeting of the International Association of Medical Museums, New York, April 17, 1935.

(8) Reduce in 1 per cent. formalin.

(9) Wash in distilled water.

(10) Place in gold chloride 1–500. Heat very slowly up to 40° C. until the characteristic violet color develops. (About 10 minutes.)

(11) Place in 1 per cent. sodium hyposulphite for a few minutes.

(12) Run through the alcohols, up through absolute, place in xylol and mount in balsam.

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A BATH FOR ORIENTING OBJECTS IN PARAFFIN

MUCH of the difficulty experienced in orienting objects in paraffin can be obviated if one has plenty of time before hardening takes place and if it is not necessary to move the tray to a cooler base. The writer customarily uses paper trays of sufficient size to accommodate as many as a dozen objects. In order to keep the paraffin melted until orientation is complete and to harden the paraffin rapidly without change of position, an embedding bath has been devised which is satisfactory. In Fig. 1, "R" is a ring

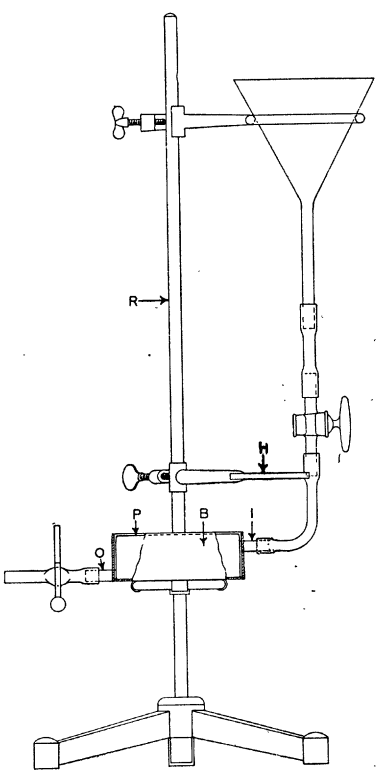

FIG. 1

stand on a tripod base; "B," a bath open at the top, made of 20-ounce copper and measuring 4¼ inches × 3½ inches × 1⅝ inches on the inside, fastened firmly to a 3-inch ring by 3 flanges riveted to the bottom. "I" is a ¼-inch inlet pipe soldered into the bath near the top at the corner near the ring stand, and "O" an outlet of the same size at the bottom in the diagonal corner. Connection is made by rubber tubing and glass stopcock to a funnel supported in a 4-inch ring on the ring stand, while the outlet is controlled by a pinchcock on a short piece of rubber tubing. Fitting into the bath not too loosely is a platform, "P," made of a sheet of 32-ounce copper bent so that it is supported at bottom of the bath at the ends, with the top flush with the top edge of the bath. In the legs of the platform holes are drilled at inlet and outlet to allow free movement of liquid. A 2½-inch ring, "H," from the ring stand serves as a hand rest while orienting.

In operation about 250 cc of hot water is introduced either at inlet through funnel or preferably from another funnel (not shown) through outlet. The paper tray containing melted paraffin and objects to be imbedded is placed on the warm stage where orientation is accomplished, under strong light and binoculars if necessary. The stage will remain warm for 5 to 10 minutes with little trouble, and longer if the bottom of the bath is heated with a flame. The warm water is then drawn off at the outlet and 250 cc of ice water run in from the funnel reservoir. Hardening of paraffin sufficient to hold objects in place occurs within 60 seconds, after which the block is placed in ice water to complete solidification. The operation can be expedited by attaching a hot-water reservoir to the outlet pipe through a 3-way stop cock. The bath is of a size accommodating the nickel silver tray for 30 slides, sold by Arthur H. Thomas and Company, and when the platform is removed, can be used for washing and rehydrating slides. The bath alone was made for $3.50.

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